

# How many samples do we need to map soil properties at field level? - Preliminary results

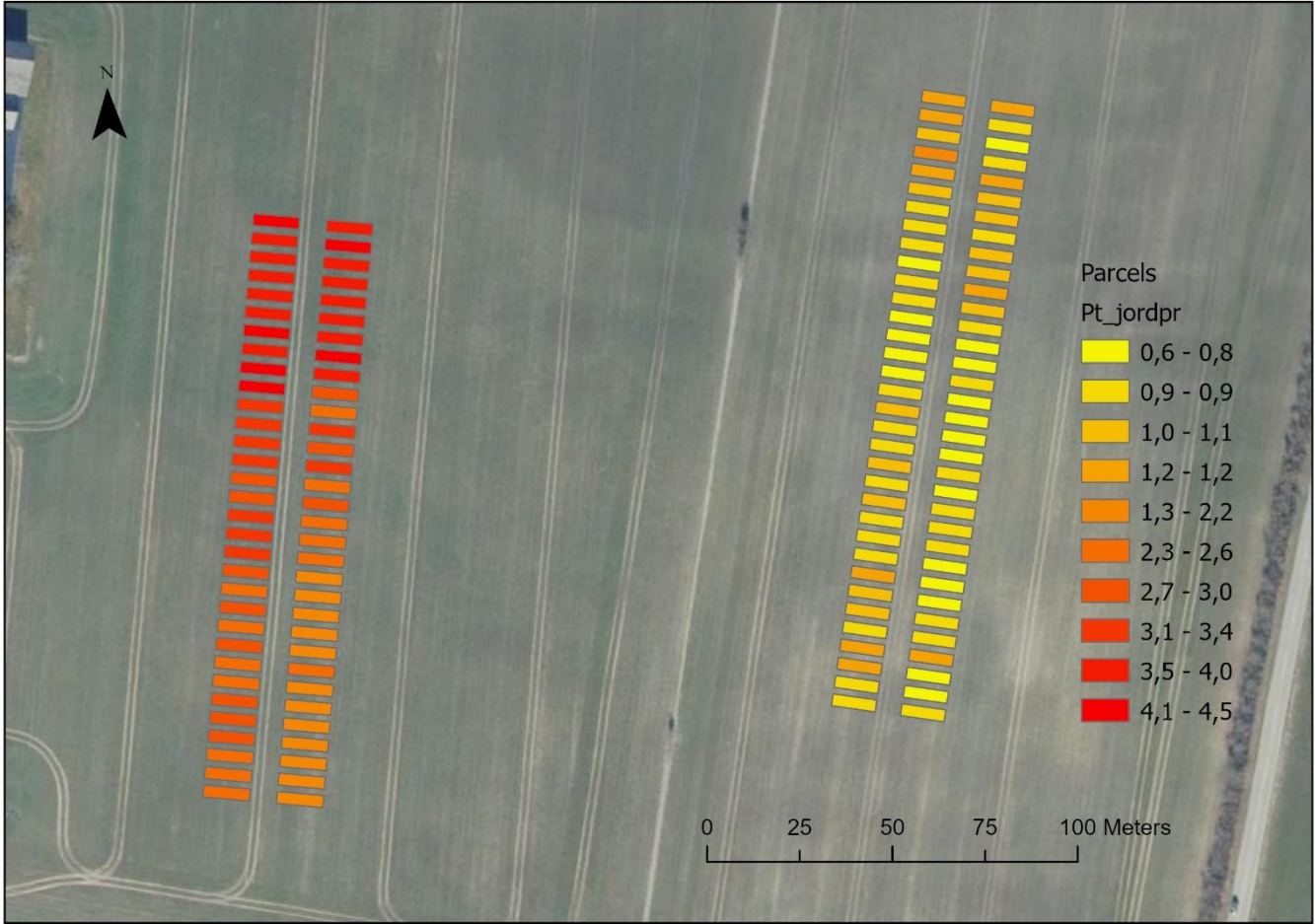
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Anders Bjørn Møller

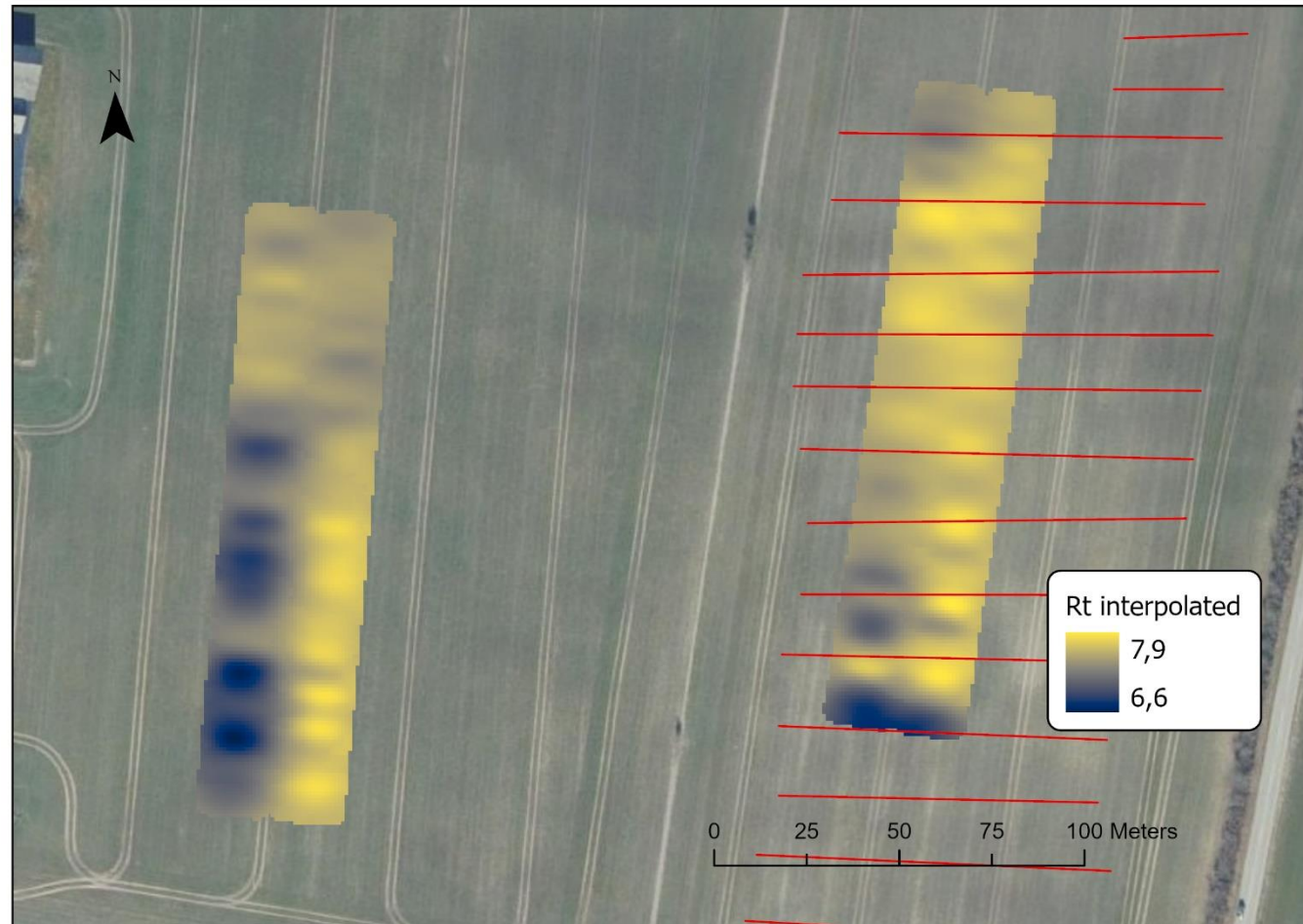
Department of Agroecology

Aarhus University

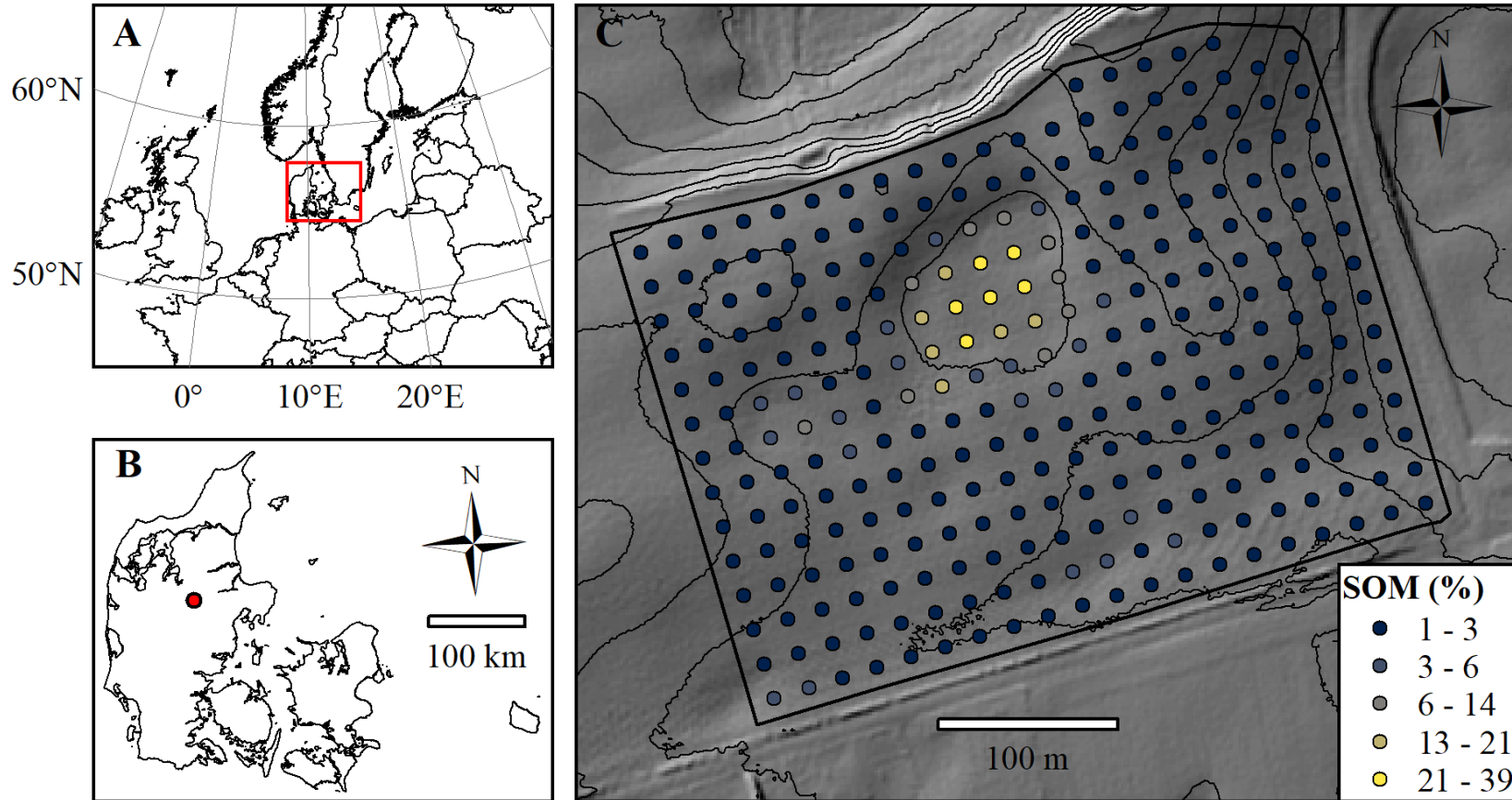
# SITE 1: PARCELS



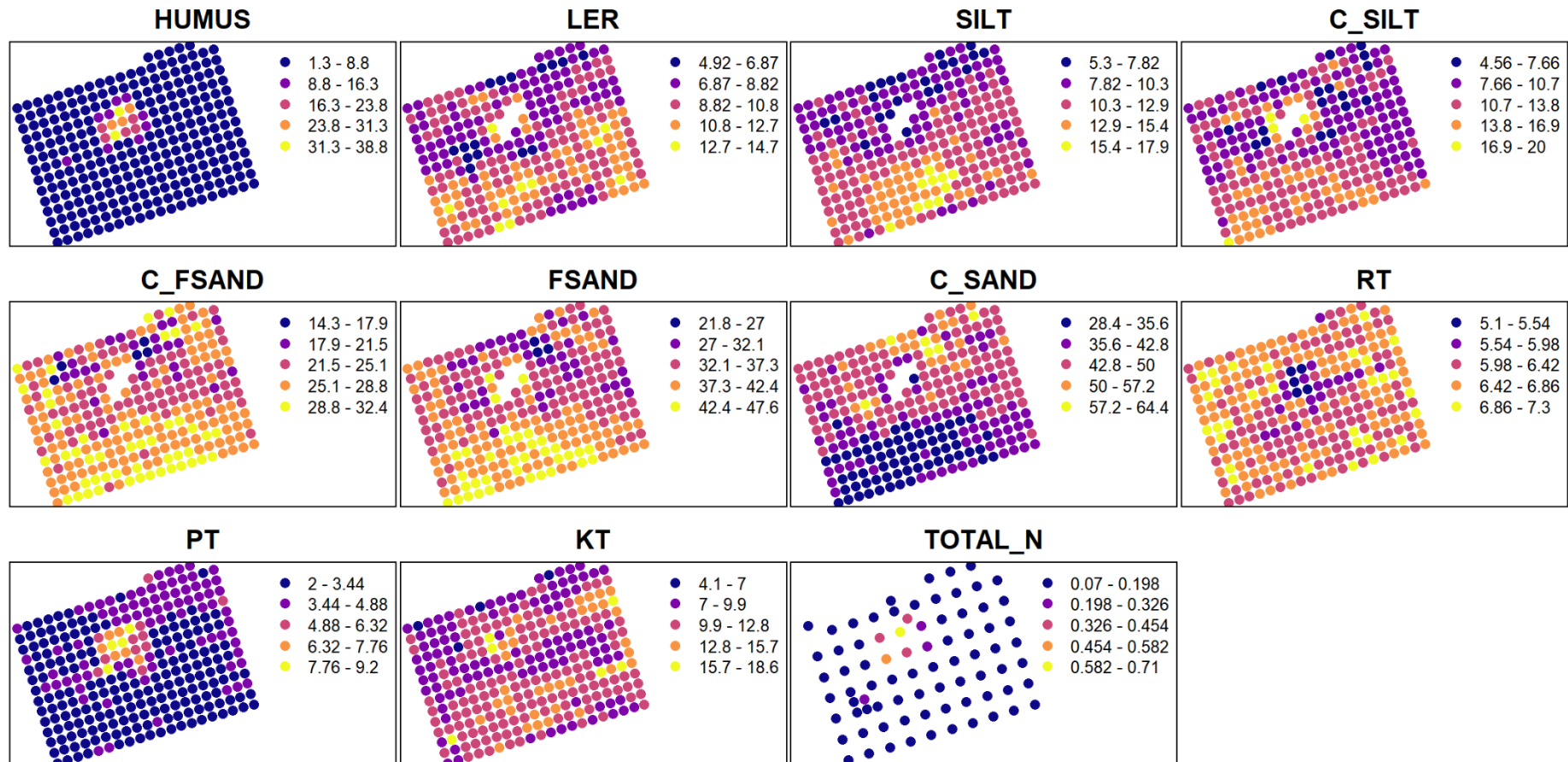
# PARCELS – DRAINAGE SYSTEM?



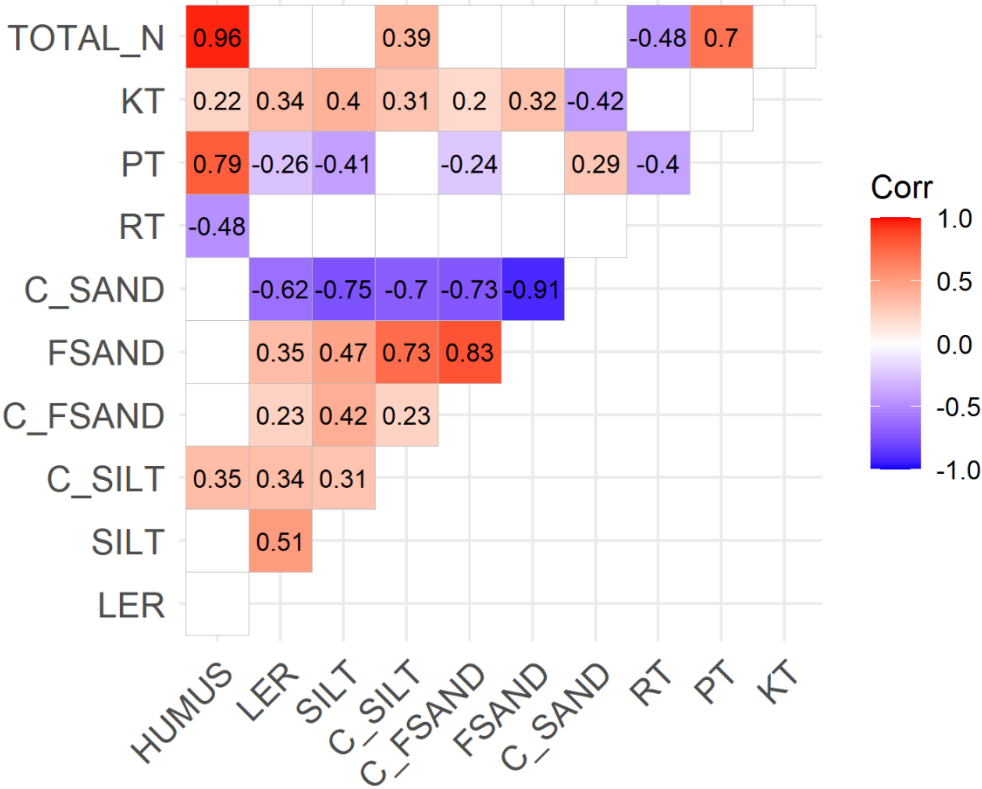
# SITE 2: VINDUM



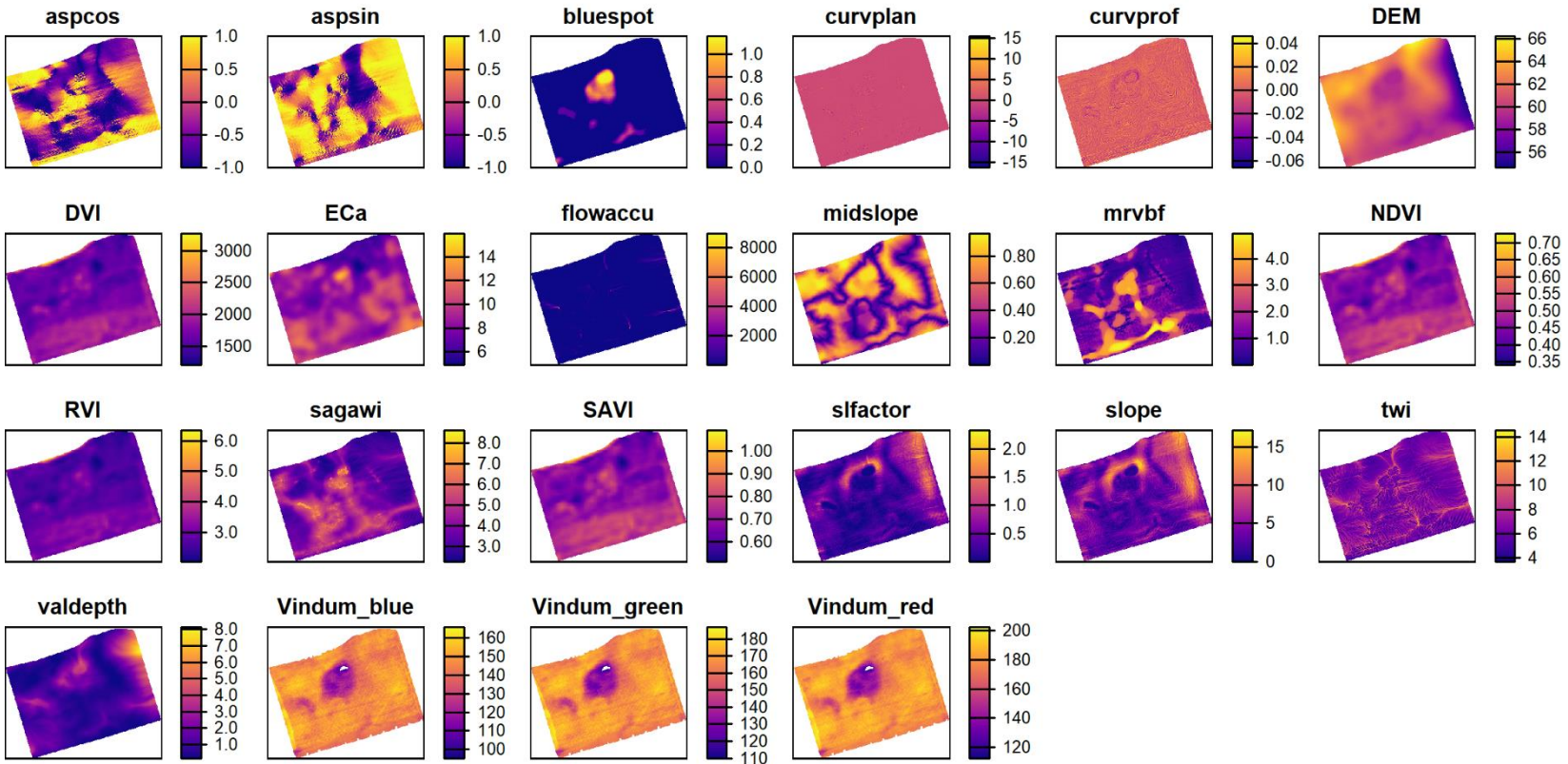
# SOIL OBSERVATIONS AT VINDUM



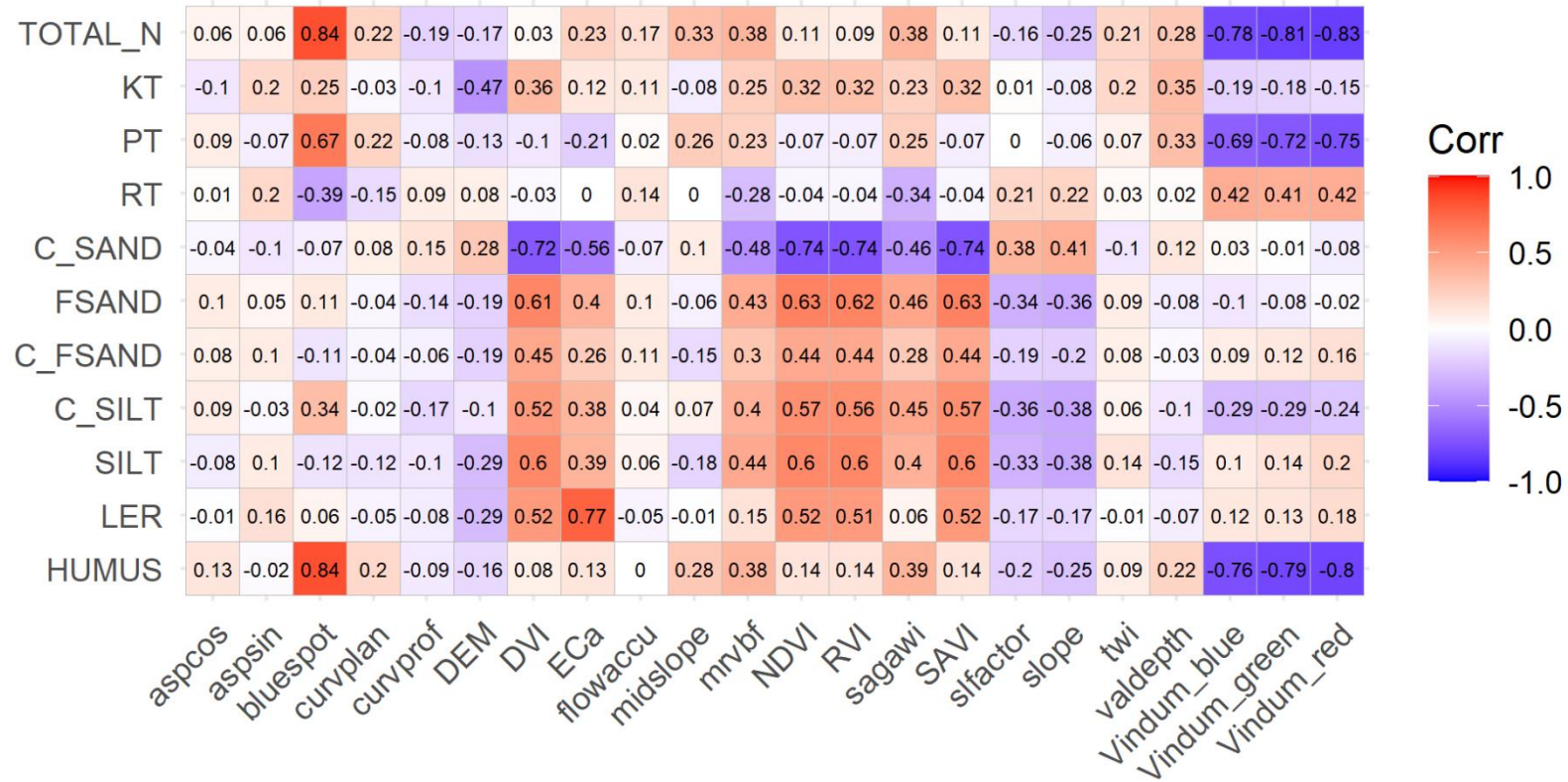
# SOIL OBSERVATIONS: INTERNAL CORRELATION



# COVARIATES FOR VINDUM



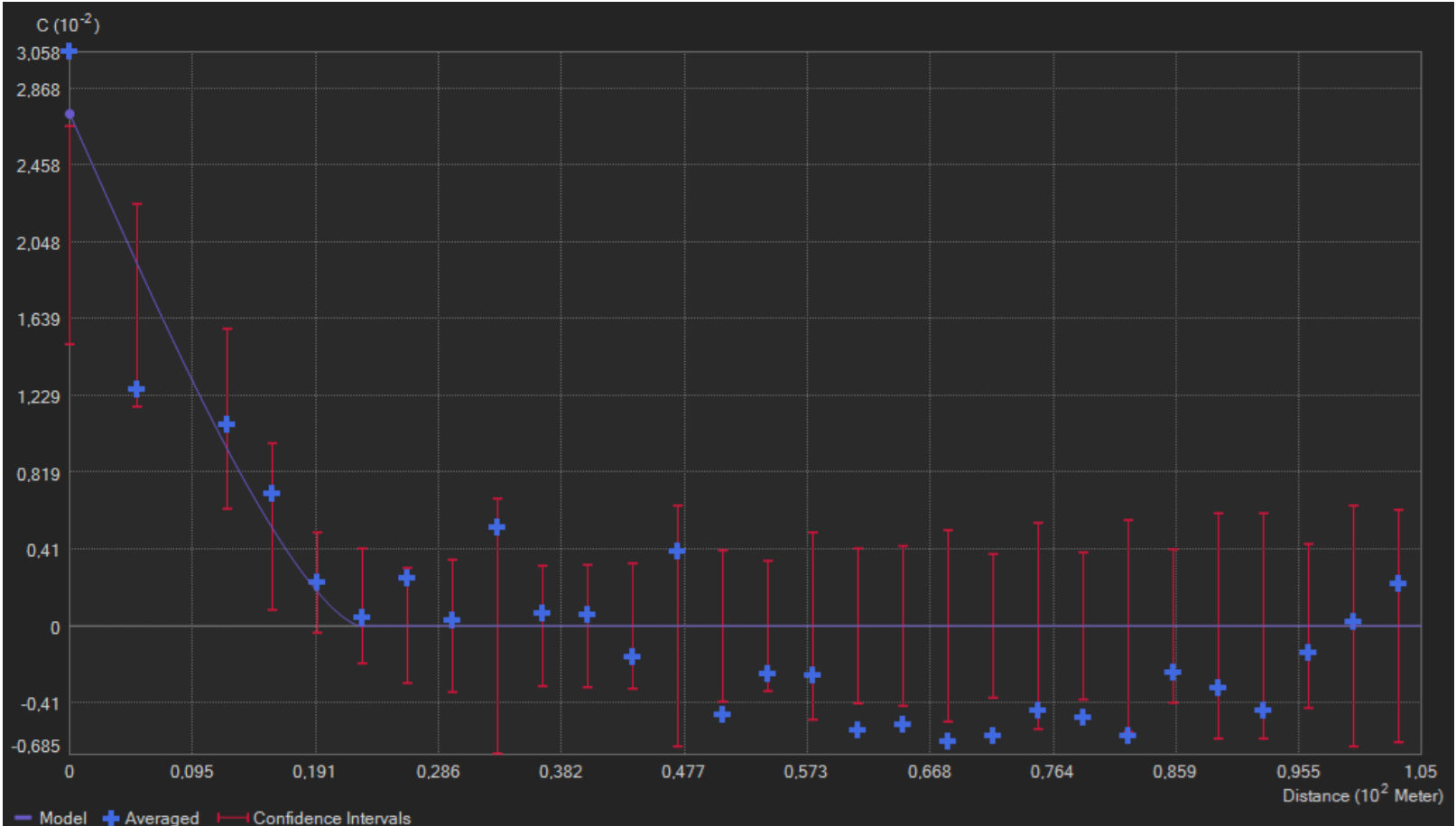
# CORRELATION WITH COVARIATES





# COVARIOGRAM: PT, PARCELS EAST

— Model :  $0,027291 * \text{Circular}(22,596)$

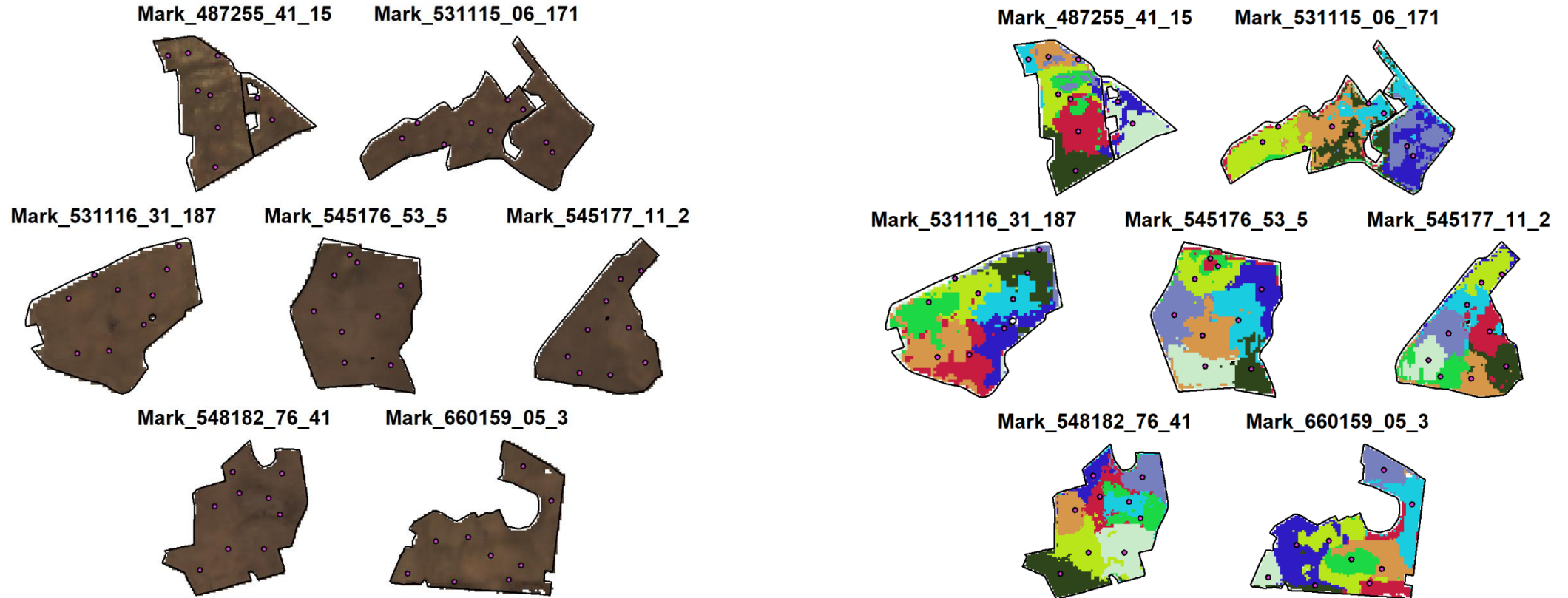


# COMPARISON: VARIOGRAM RANGE

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	Variogram range (m)				
Site	Kt	Mgt	Pt	Rt	Mean
Vindum	35	100	110	32	69
Parcels West	45	32	64	20	40
Parcels East	30	25	23	27	26
Parcels All	148	151	167	25	123
Mean	65	77	91	26	65

# K-MEANS OPTIMIZED SAMPLING



# NEXT STEPS

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## Parcels:

- Obtain terrain variables and aerial images
- Compare covariates with soil properties

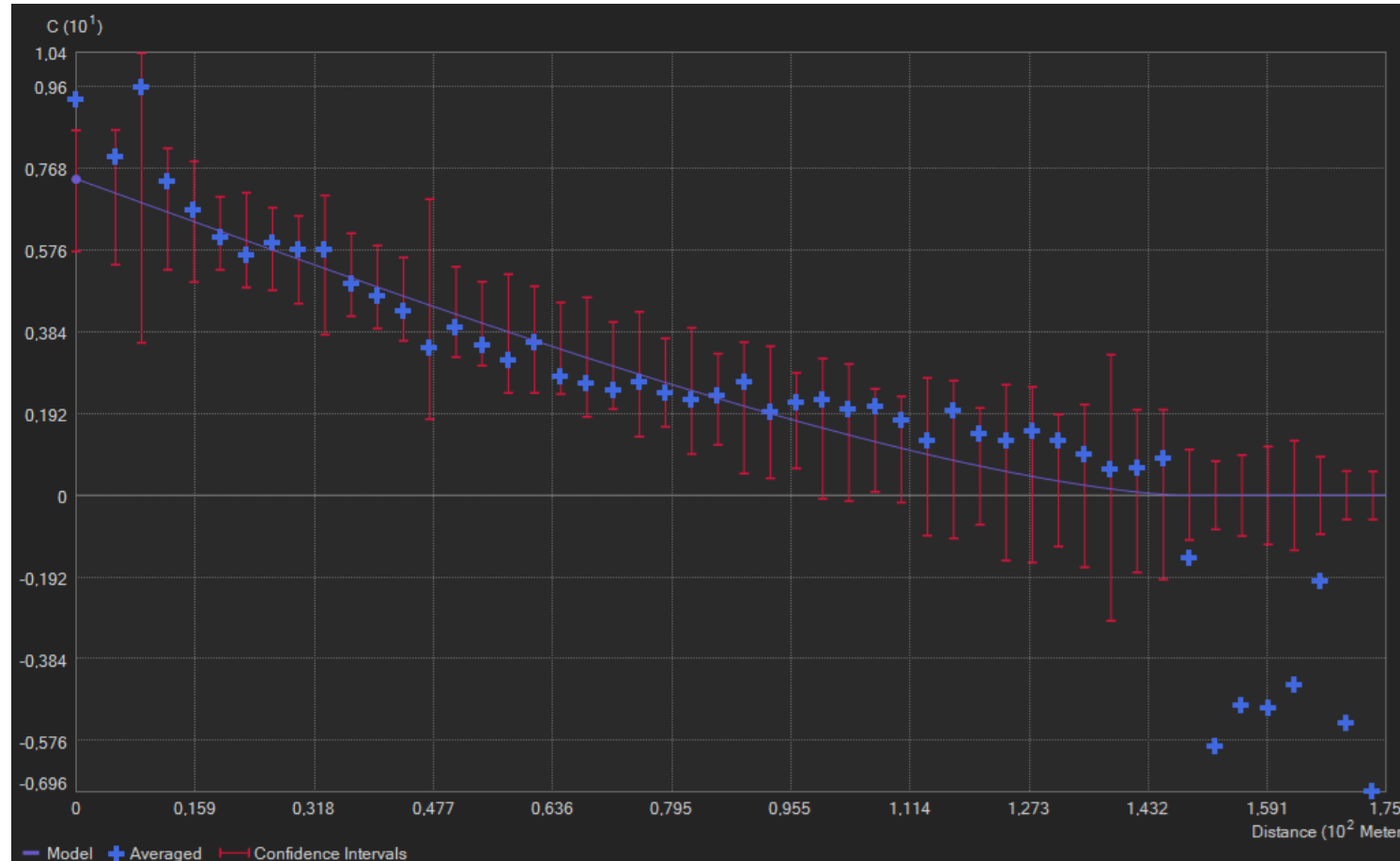
## Both sites:

- Test sampling and mapping with different  $n$ .
- Optimized vs. spatial sampling
- Interpolation with and without covariates
- Test accuracy for Kt, Pt, Mgt, Rt

# EXTRA FIGURES

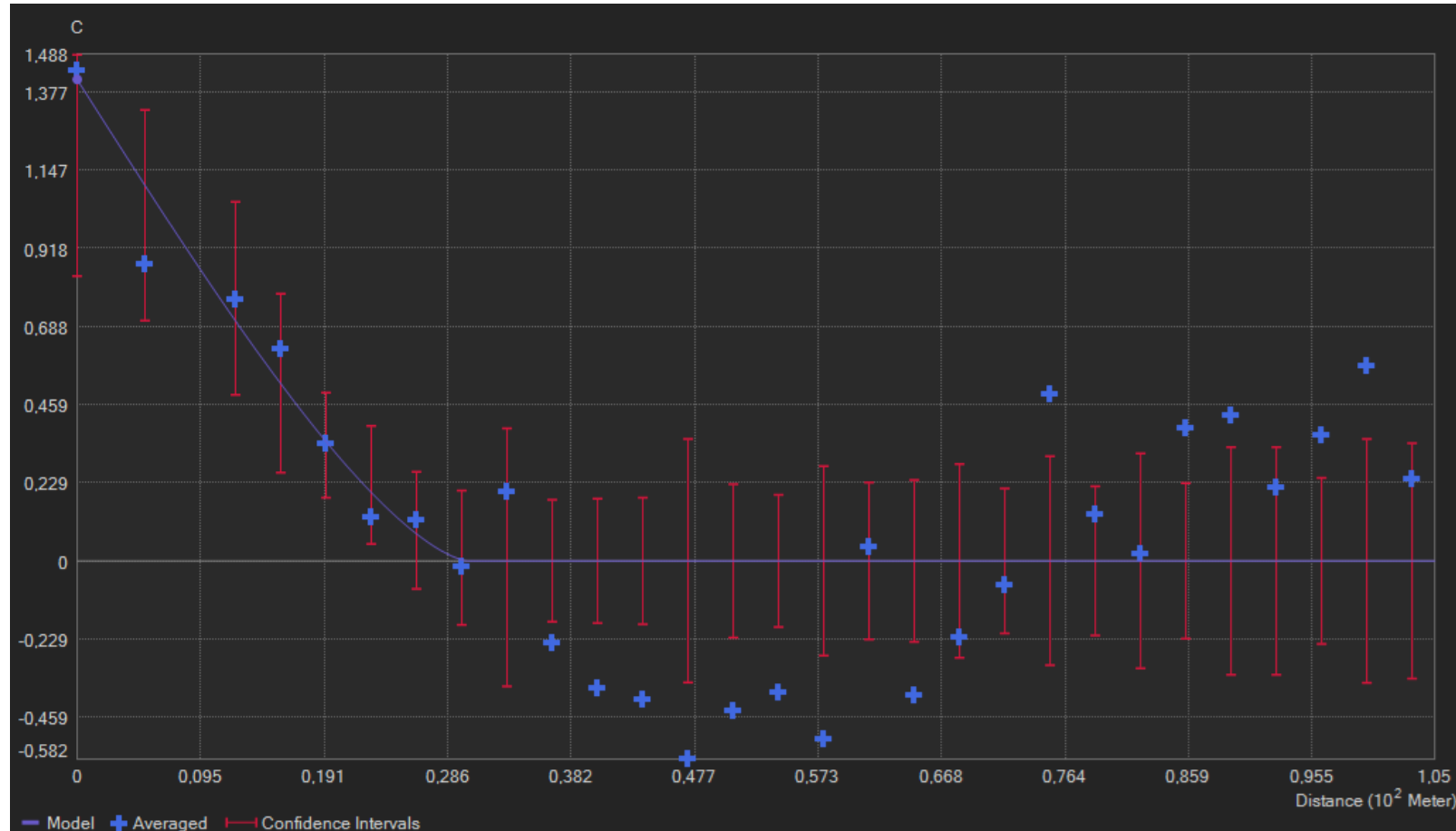
# KT, VARIOGRAM, PARCELS

Model :  $7,4321 * \text{Circular}(148,17)$



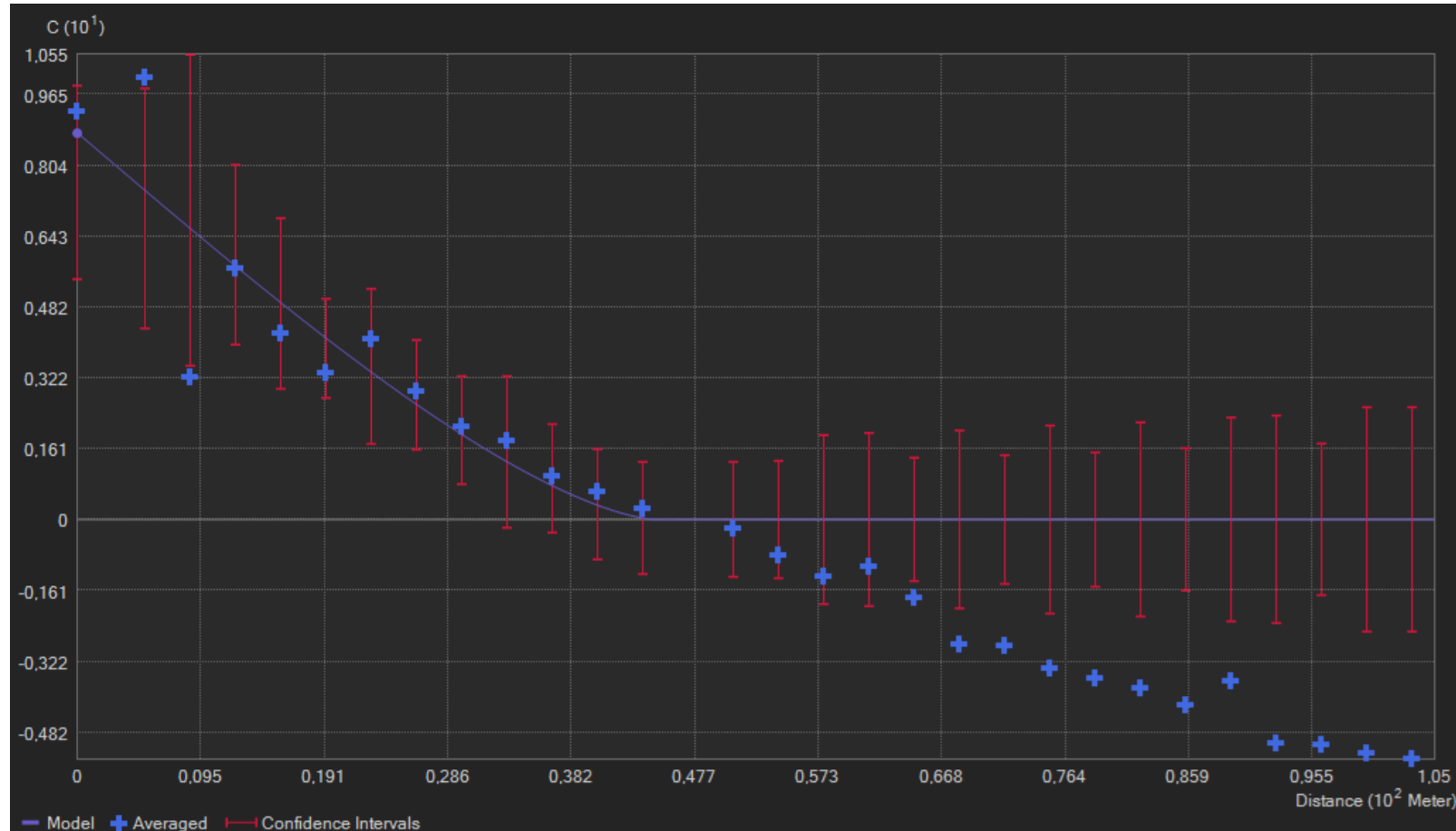
# KT, PARCELS, EAST

Model :  $1,4124 * \text{Circular}(30,225)$



# KT, PARCELS, WEST

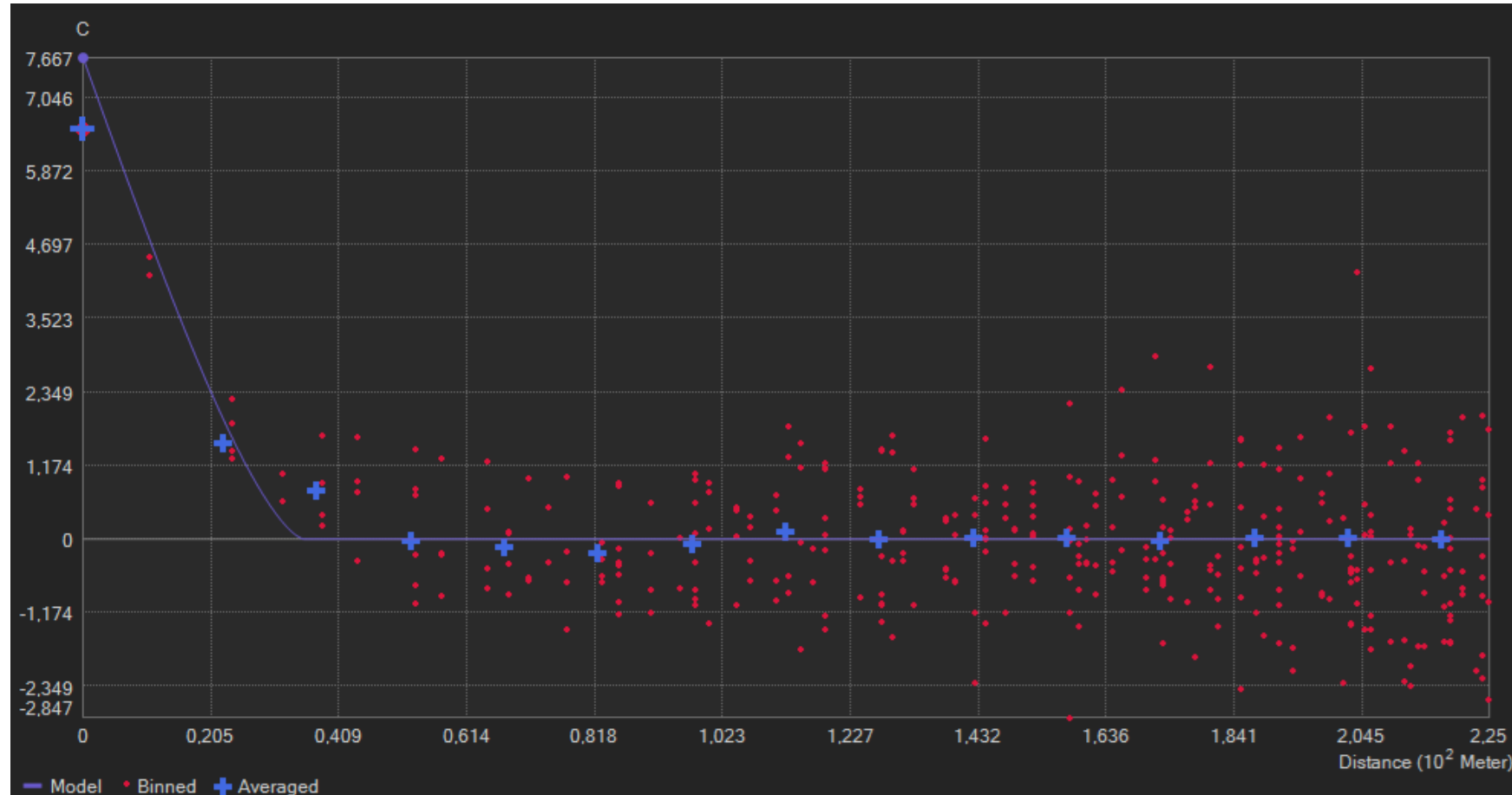
— Model :  $8,7684 * \text{Circular}(44,68)$





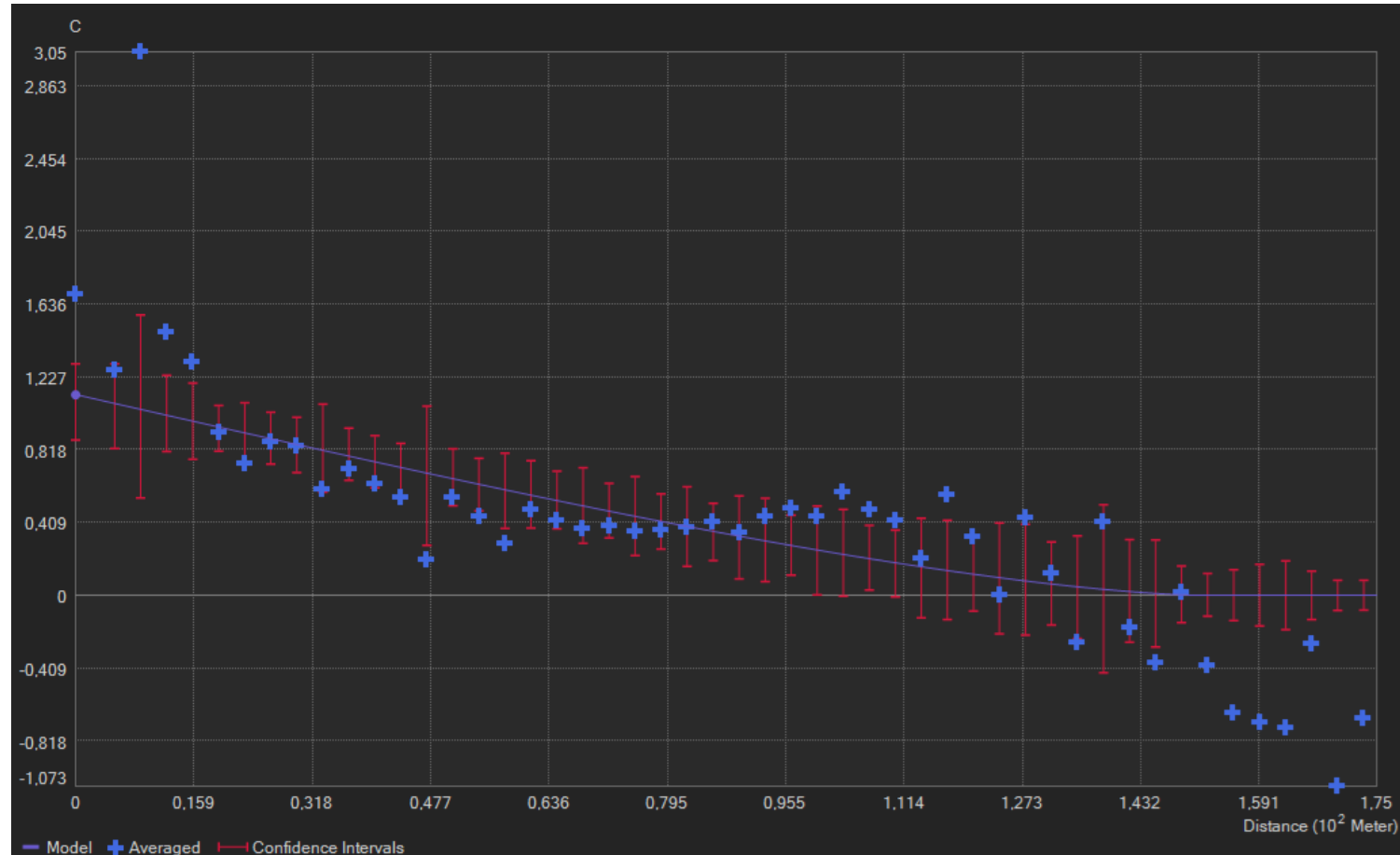
# KT, VARIOGRAM, VINDUM

— Model :  $0 \cdot \text{Nugget} + 7,6673 \cdot \text{Circular}(35,284)$



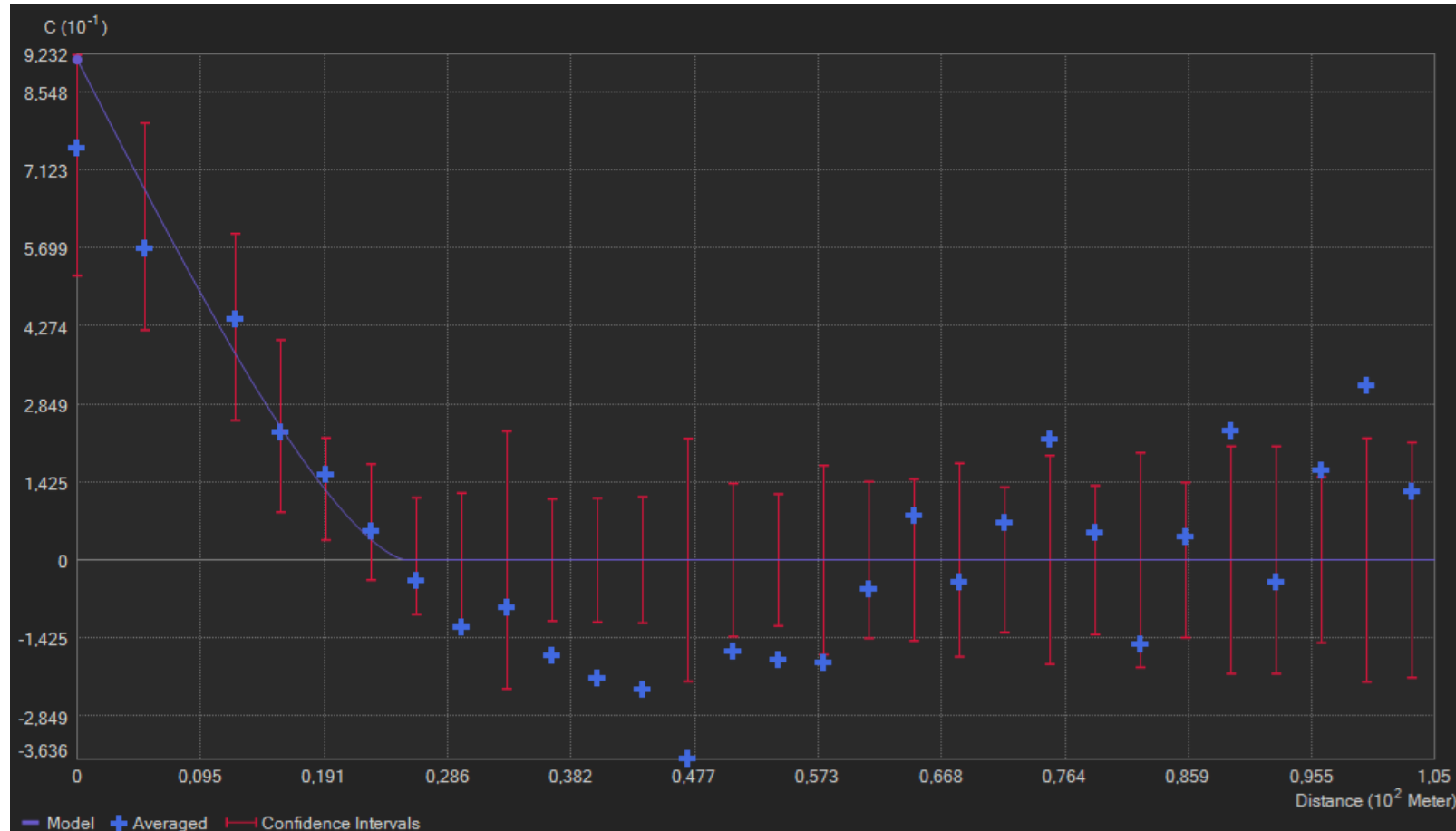
# MGT, VARIOGRAM, PARCELS

Model :  $1,1269 * \text{Circular}(151,19)$



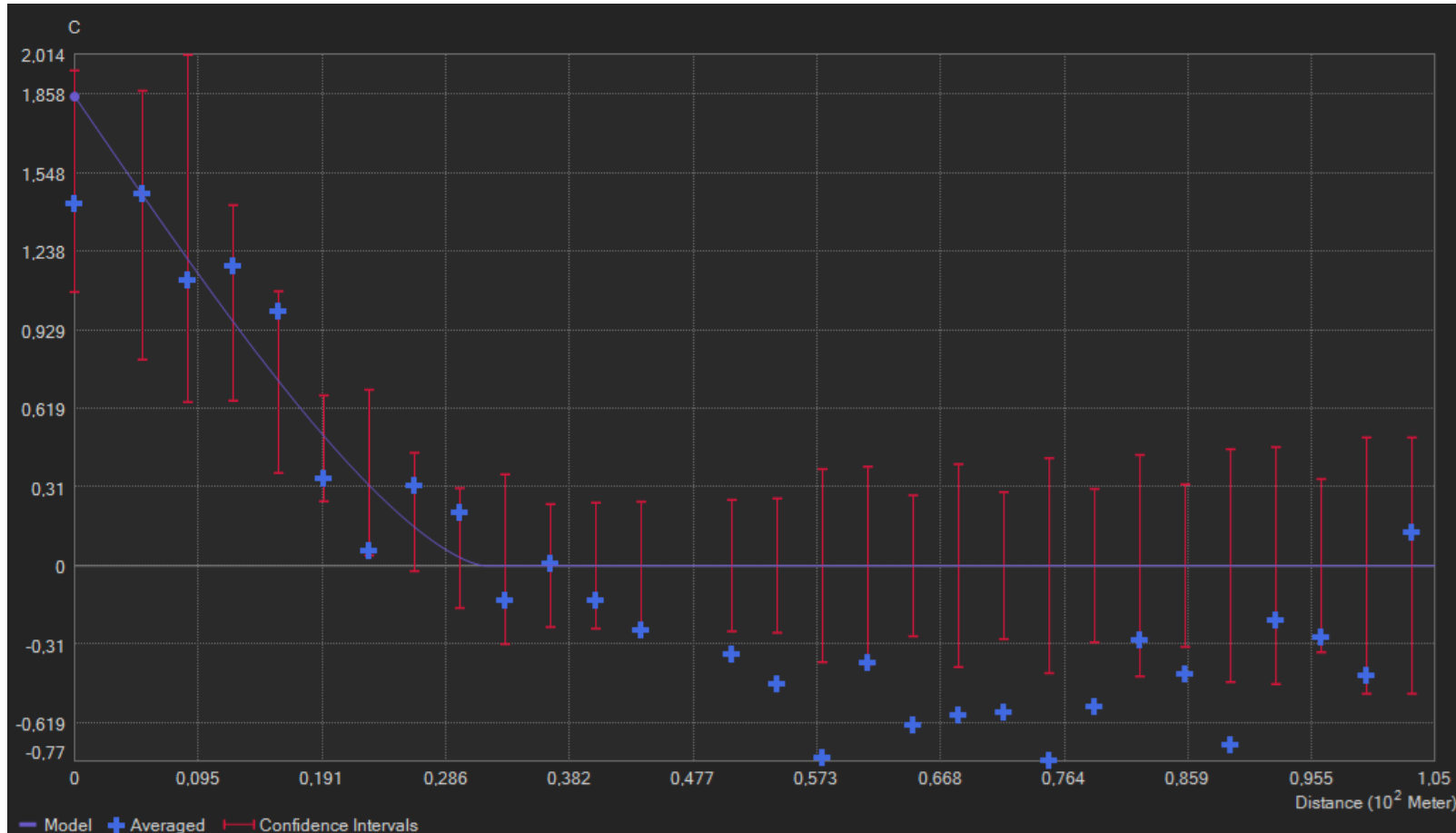
# MGT, PARCELS EAST

Model :  $0,91293 * \text{Circular}(25,431)$



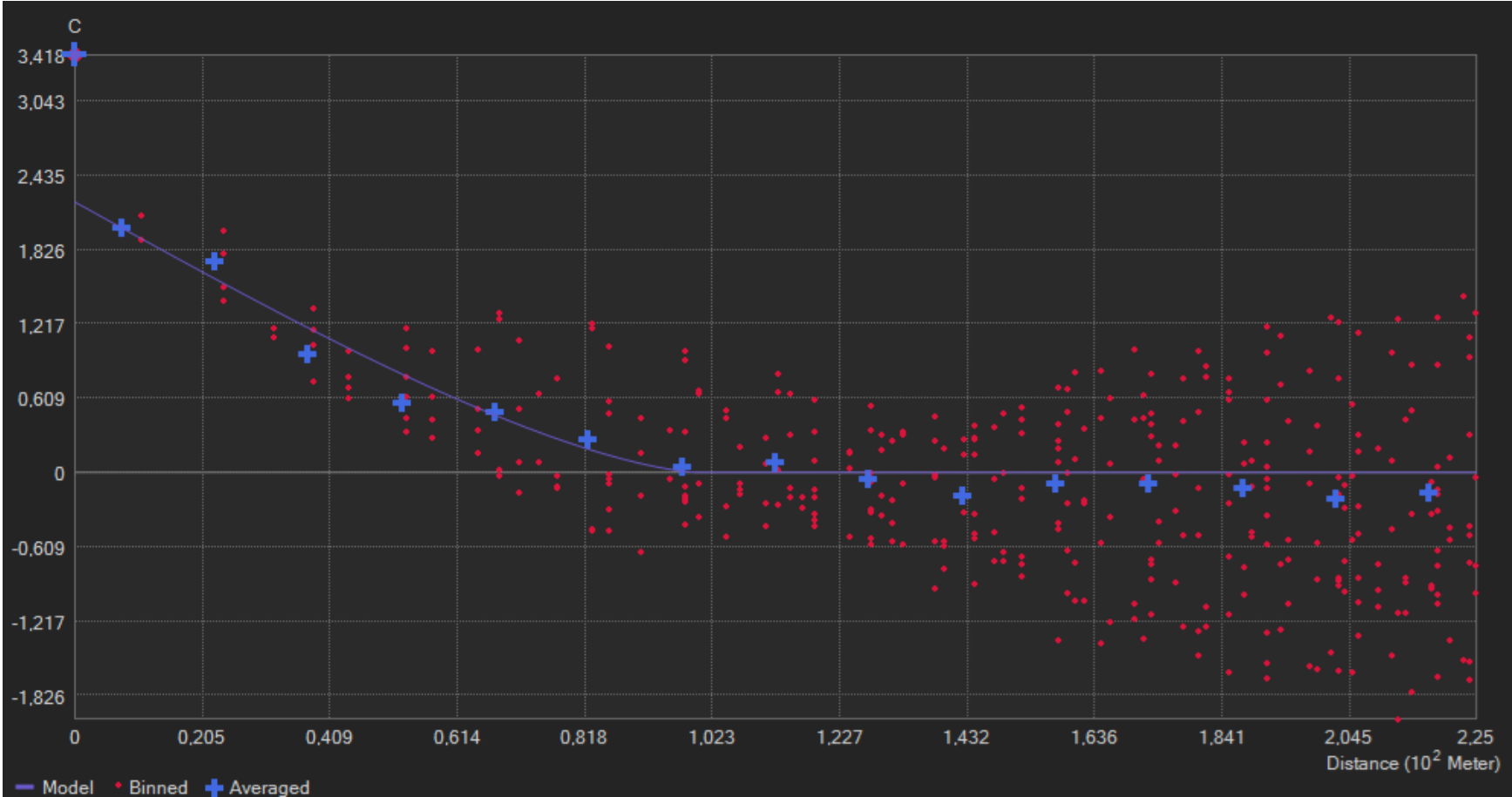
# MGT, PARCELS WEST

Model :  $1,8476 * \text{Circular}(31,63)$



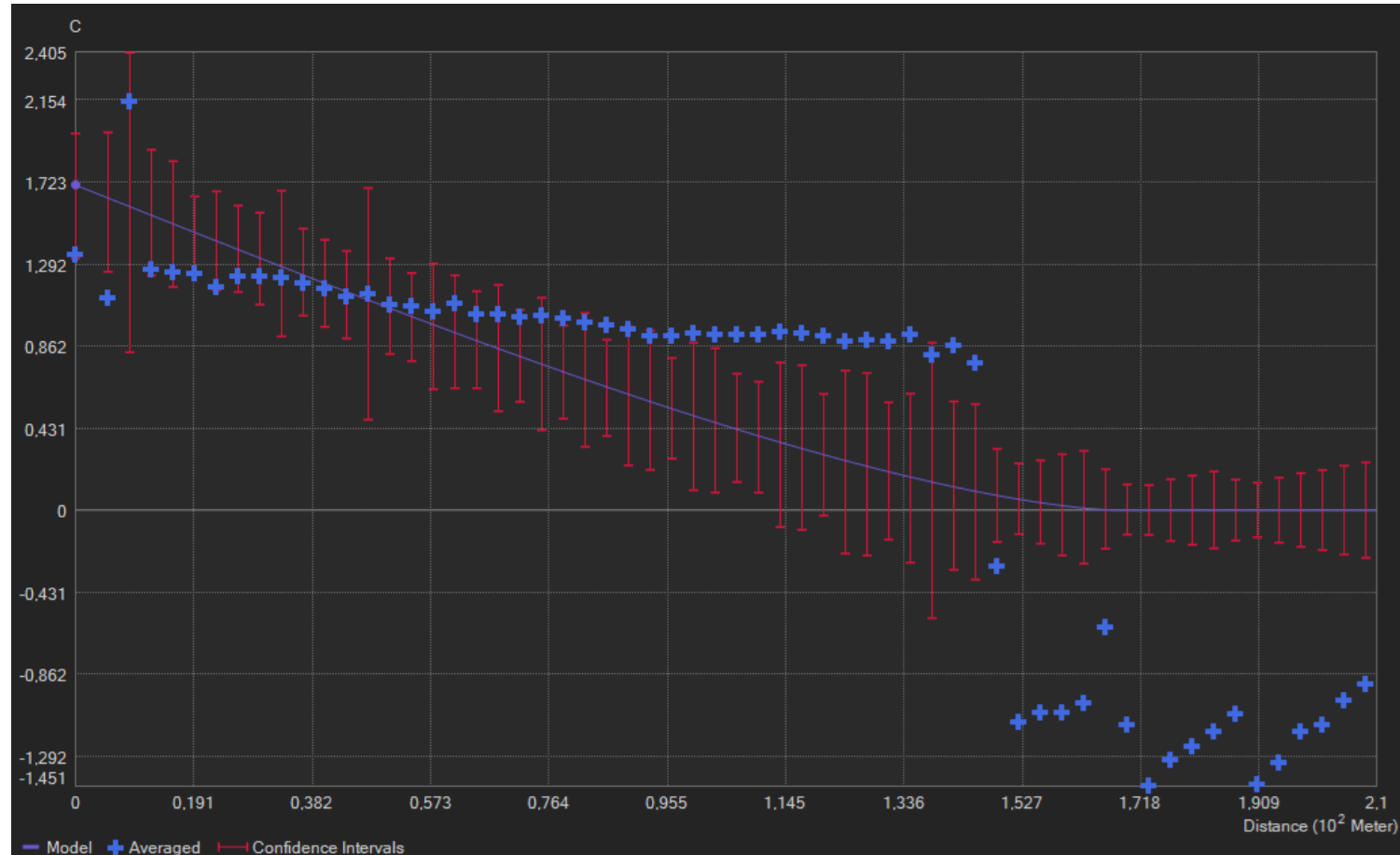
# CLAY, VINDUM (IN PLACE OF MGT)

— Model :  $1,2045 * \text{Nugget} + 2,2135 * \text{Circular}(99,943)$



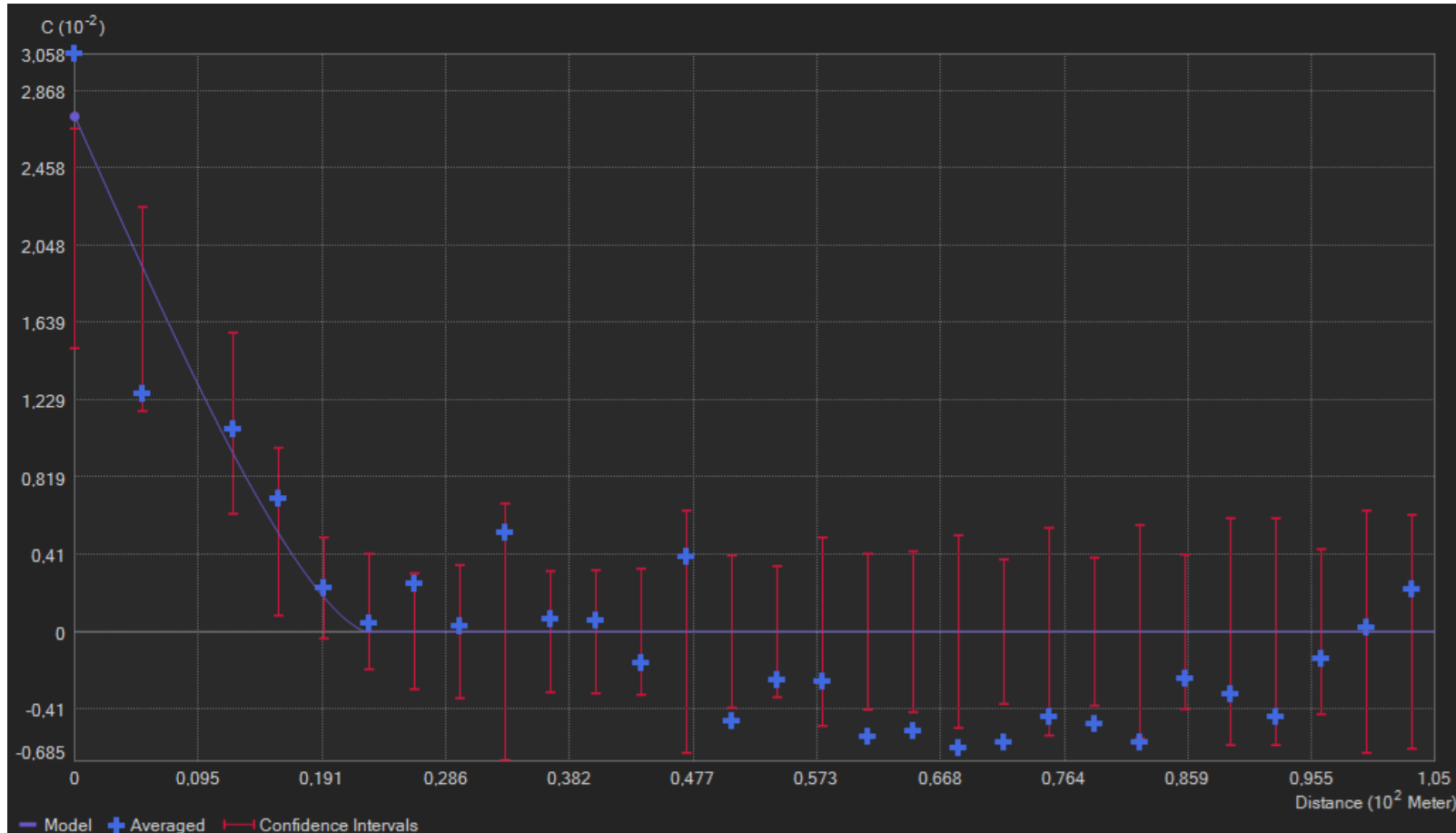
# PT, VARIOGRAM, PARCELS

Model :  $1,7064 * \text{Circular}(167,77)$



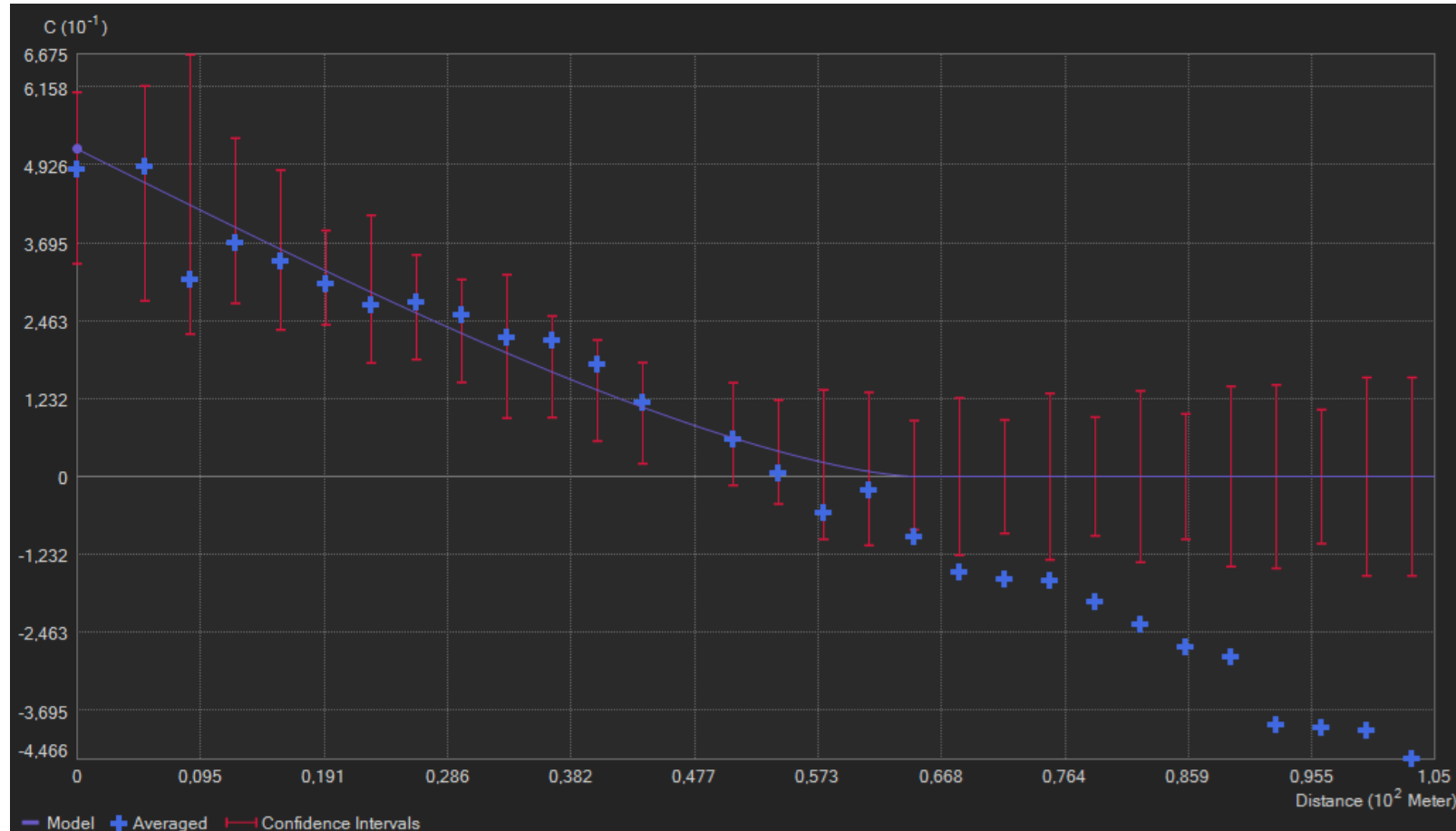
# PT, PARCELS EAST

— Model :  $0,027291 * \text{Circular}(22,596)$



# PT, PARCELS WEST

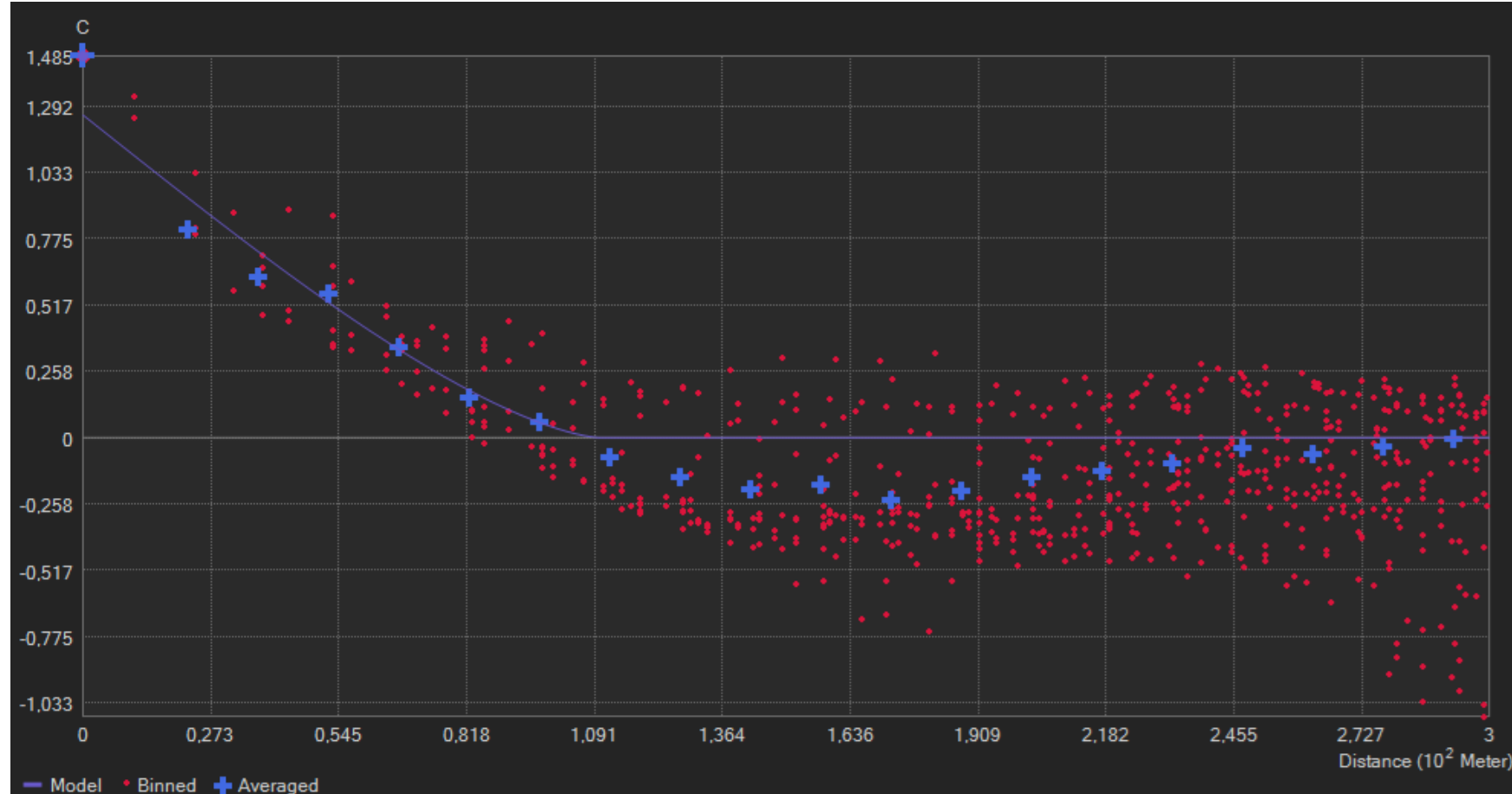
— Model :  $0,51719 * \text{Circular}(64,858)$





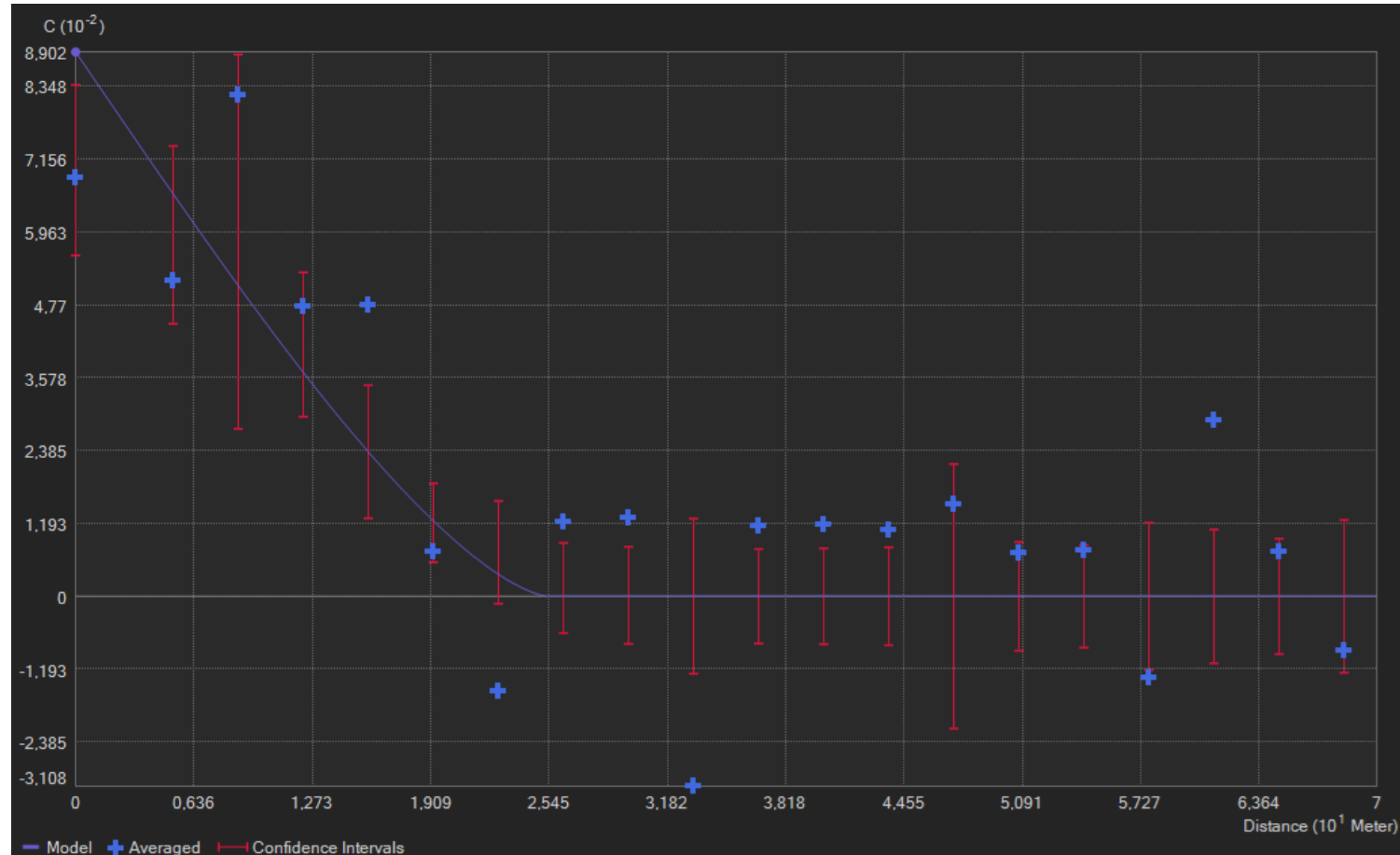
# PT, VARIOGRAM, VINDUM

— Model :  $0,22931 * \text{Nugget} + 1,2553 * \text{Circular}(110,23)$



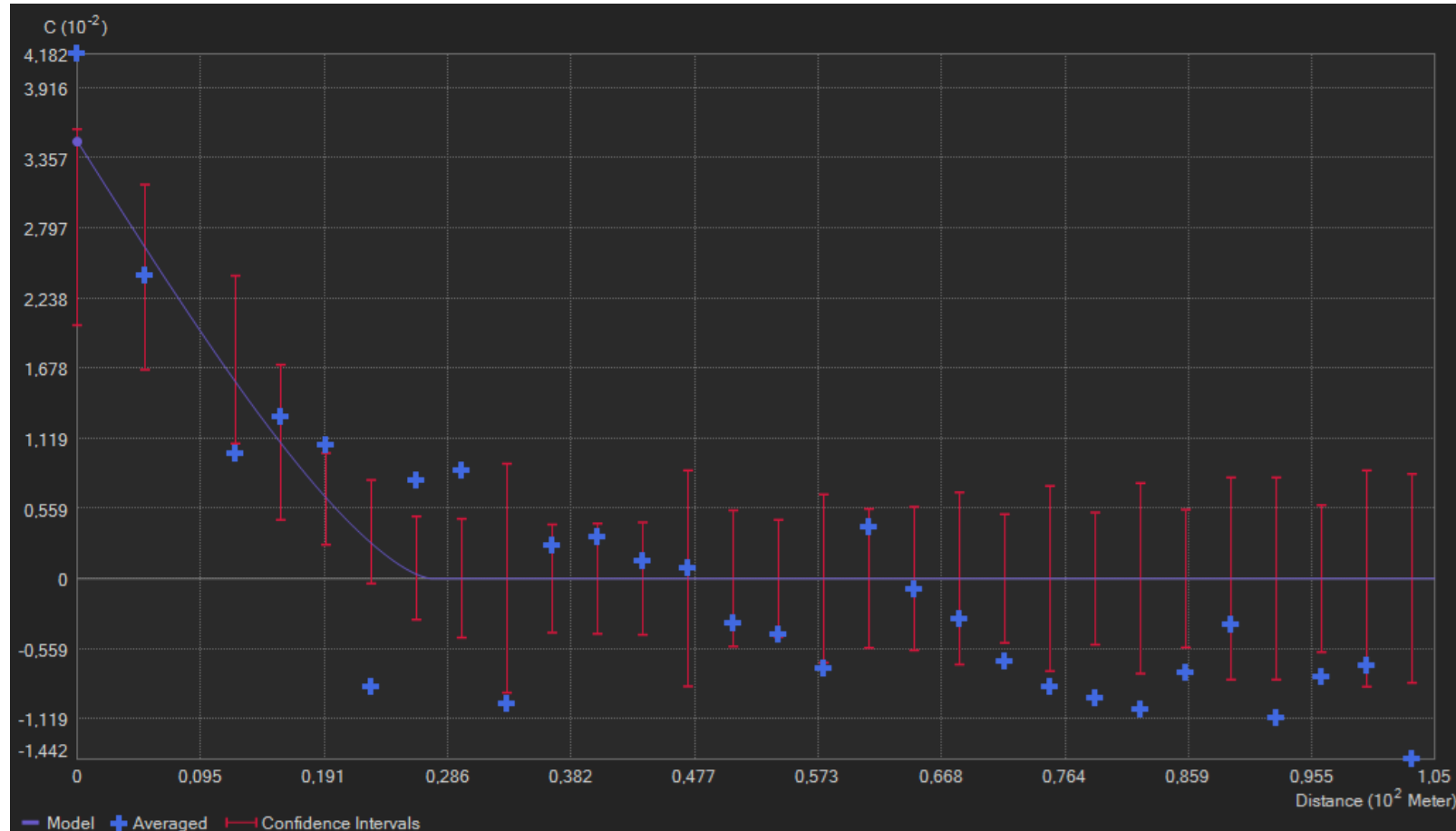
# RT, VARIOGRAM, PARCELS

— Model :  $0,089023 * \text{Circular}(25,436)$



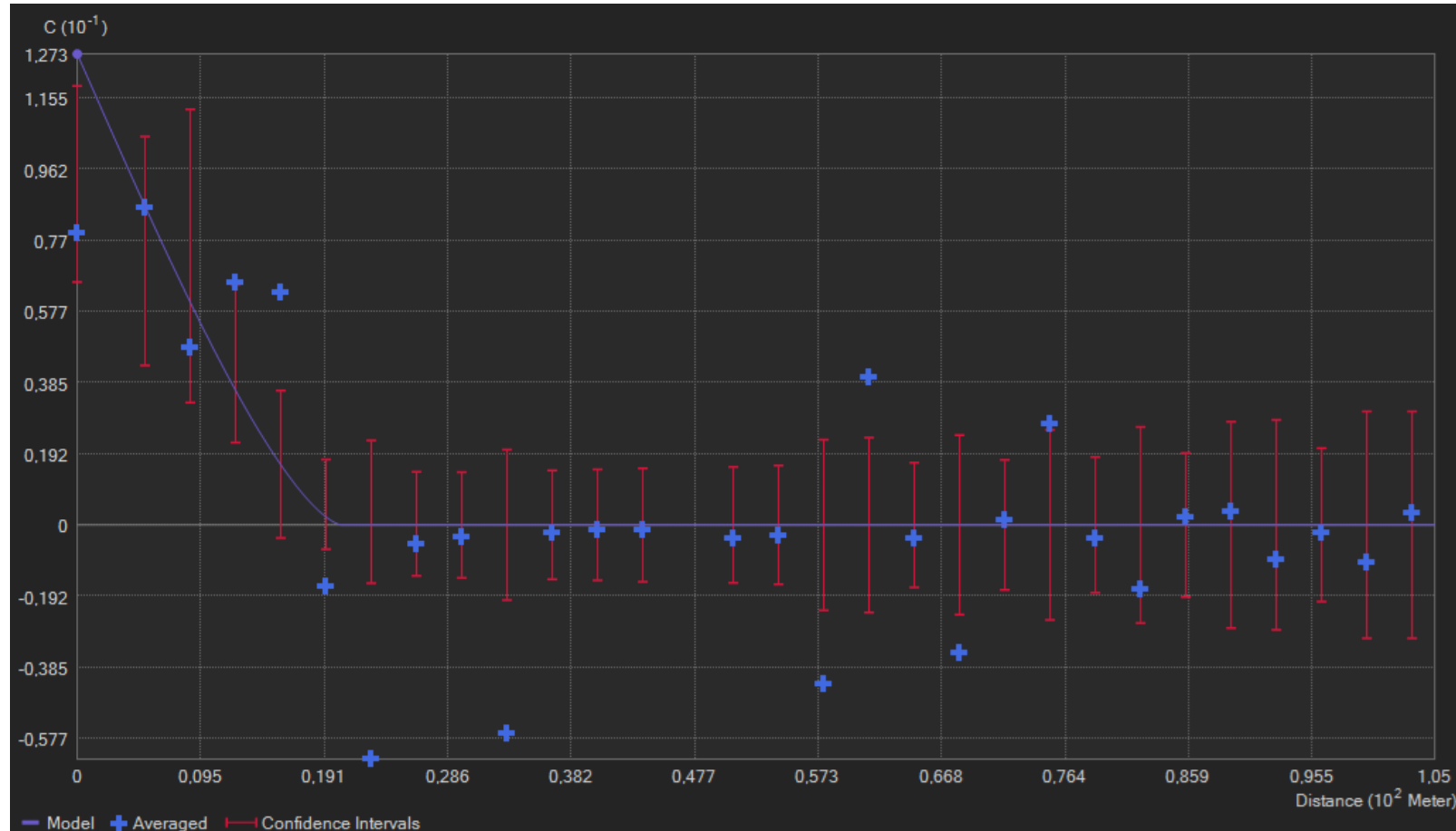
# RT, PARCELS EAST

Model :  $0,034864 * \text{Circular}(27,349)$



# RT, PARCELS WEST

— Model :  $0,12727 * \text{Circular}(20,446)$



# RT, VARIOGRAM, VINDUM

Model : 0\*Nugget+0,20611\* $\text{Circular}(32,649)$

